

## FACTORS AFFECTING THE RATE OF CHEMICAL REACTIONS

In a chemical reaction, how quickly or slowly reactants turn into products is called the **RATE OF REACTION**. A reaction that takes a long time has a low reaction rate. A reaction that occurs quickly has a high reaction rate. You can speed up or slow down the rate of a chemical reaction.

There are four main factors that affect the rate of a chemical reaction.

1. **TEMPERATURE:** Increasing the temperature causes the particles of the reactants to move more quickly so that they collide with each other more frequently and with more energy. Thus, the higher the temperature, the greater the rate of reaction. If you decrease the temperature, the particles will move more slowly, therefore decreasing the rate of reaction.
2. **CONCENTRATION:** Concentration refers to how much solute is dissolved in a solution. If a greater concentration of reactant is present, there is a greater chance that collisions will occur among them. More collisions mean a higher reaction rate. Thus, increasing the concentration of the reactants usually results in a higher reaction rate. At lower concentrations, there is less chance for collisions between particles. Thus, decreasing the concentrations of reactants results in a lower reaction rate.
3. **SURFACE AREA:** Surface area is the measure of how much area of an object is exposed. For the same mass, many small particles have a greater surface area than one large particle. The more surface contact between reactants, the higher the rate of reaction. The less surface contact, the lower the reaction rate. Surface area can also be important if a reaction occurs between two liquids that do not mix. In this case, the reaction occurs only at the boundary where the two liquids meet. It is also important to note that not all reactions depend on surface area. If both reactants are gases or liquids that mix together, then there is no surface, and surface area is not a factor.
4. **CATALYST:** A catalyst is a substance that speeds up the rate of a chemical reaction without being used up in the reaction itself. Catalysts reduce the amount of energy required to break and form bonds during a chemical reaction. Enzymes are catalysts that allow chemical reactions to occur at relatively low temperatures within the body.